

DEEP-SEA RESEARCH

PART I

OCEANOGRAPHIC RESEARCH PAPERS

VOLUME 40, 1993

VOLUME CONTENTS AND AUTHOR INDEX

Editor:

DR MICHAEL P. BACON: *Department of Marine Chemistry and Geochemistry
Woods Hole Oceanographic Institution, Woods Hole, MA 02543, U.S.A.*

Founder Editor: DR MARY SEARS



PERGAMON

DEEP-SEA RESEARCH I

Editor

DR MICHAEL P. BACON: *Department of Marine Chemistry and Geochemistry, Woods Hole Oceanographic Institution, Woods Hole, MA 02543, U.S.A.*

Associate Editors

D. M. ALONGI (*Benthic Biology*)
*Australian Institute of Marine Science,
PMB No. 3,
Townsville Mail Centre,
Queensland 4810, Australia*

P. H. BURKILL (*Pelagic Foodwebs*)
*Plymouth Marine Laboratory,
Prospect Place,
Plymouth PL1 3DH, U.K.*

C. GARRETT (*Ocean Physics*)
*Department of Physics and Astronomy,
University of Victoria,
P.O. Box 3055,
Victoria, BC,
Canada V8W 3P6*

S. M. HENRICHs (*Chemistry*)
*Institute of Marine Science,
University of Alaska,
Fairbanks, AK 99775-1080, U.S.A.*

J. MARRA (*Productivity*)
*Lamont-Doherty Earth Observatory,
Palisades, NY 10964, U.S.A.*

P. L. RICHARDSON (*Ocean Circulation*)
*Physical Oceanography Department,
Woods Hole Oceanographic Institution,
Woods Hole, MA 02543, U.S.A.*

V. SMETACEK (*Vertical Fluxes*)
*Alfred-Wegener-Institut für Polar- und
Meeresforschung,
Am Handelshafen 12, D-27570 Bremerhaven,
Germany*

Founder Editor: DR MARY SEARS

Production Editor: P. RUSSELL, Elsevier Science Ltd, Oxford OX5 1GB, U.K. (Tel.: 0865 743744)

Publishing, Subscription and Advertising Offices: The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, U.K. (Tel.: 0865 794141)

Published monthly

Second class postage paid at Rahway, NJ. Postmaster send address corrections to Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A.

Annual Institutional Subscription Rates (1994): North, Central and South America, U.S.\$1565.00, Rest of World £1015.00. This includes Part I and Part II (Topical Studies in Oceanography). Associated personal subscription rates are available for those whose institutions are library subscribers. Annual Institutional Subscription Rates (1994) for *Deep-Sea Research* Parts I and II with *Oceanographic Literature Review*: North, Central and South America, U.S.\$2000.00, Rest of World £1298.00. Sterling prices exclude VAT. Non-VAT registered customers in the European Community will be charged the appropriate VAT in addition to the price listed. Prices include postage and insurance and are subject to change without notice.

Subscription enquiries from customers in North America should be sent to: Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A. and for the remainder of the world to: Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, U.K.

Copyright © 1994 Elsevier Science Ltd

Whilst every effort is made by the publishers and editorial board to see that no inaccurate or misleading data, opinion or statement appear in this journal, they wish to make it clear that the data and opinions appearing in the articles and advertisements herein are the sole responsibility of the contributor or advertiser concerned. Accordingly, the publishers, the editorial board and editors and their respective employees, officers and agents accept no responsibility or liability whatsoever for the consequences of any such inaccurate or misleading data, opinion or statement.

Contents of Volume 40

January

EDITORIAL	I
B. L. BINGHAM and C. M. YOUNG	1 Larval phototaxis in barnacles and snails associated with bathyal sea urchins
Y. YOU and M. TOMCZAK	13 Thermocline circulation and ventilation in the Indian Ocean derived from water mass analysis
S. L. STROM	57 Production of pheopigments by marine protozoa: results of laboratory experiments analysed by HPLC
T. L. HOPKINS, T. M. LANCRAFT, J. J. TORRES and J. DONNELLY	81 Community structure and trophic ecology of zooplankton in the Scotia Sea marginal ice zone in winter (1988)
A. G. DICKSON	107 pH buffers for sea water media based on the total hydrogen ion concentration scale
O. GUERIN-ANCEY and P. M. DAVID	119 Use of a multibeam-multifrequency sounder to study the distribution of small zooplankton
R. J. M. HUDSON and F. M. M. MOREL	129 Trace metal transport by marine microorganisms: implications of metal coordination kinetics
D. THISTLE, B. HILBIG and J. E. ECKMAN	151 Are polychaetes sources of habitat heterogeneity for harpacticoid copepods in the deep sea?
J. C. GOLDMAN	159 Potential role of large oceanic diatoms in new primary production
A. H. ORSI, W. D. NOWLIN JR and T. WHITWORTH III	169 On the circulation and stratification of the Weddell Gyre
A. SURYANARAYANA, V. S. N. MURTY and D. P. RAO	205 Hydrography and circulation of the Bay of Bengal during early winter, 1983
List of Contents for <i>Continental Shelf Research</i> , Vol. 12, No. 11 and No. 12	i

February

D. A. HANSELL, P. M. WILLIAMS and B. B. WARD	219 Measurements of DOC and DON in the Southern California Bight using oxidation by high temperature combustion
D. NOF and D. B. OLSON	235 How do western abyssal currents cross the equator?
U. SCHÜBLER and K. KREMLING	257 A pumping system for underway sampling of dissolved and particulate trace elements in near-surface waters
M. RHEIN and H. H. HINRICHSSEN	267 Modification of Mediterranean Water in the Gulf of Cadiz, studied with hydrographic, nutrient and chlorofluoromethane data

W. E. JOHNS, D. M. FRATANTONI and R. J. ZANTOPP	293	Deep western boundary current variability off northeastern Brazil
D. L. GARRISON, K. R. BUCK and M. M. GOWING	311	Winter plankton assemblage in the ice edge zone of the Weddell and Scotia Seas: composition, biomass and spatial distributions
M. M. RUTGERS VAN DER LOEFF and G. W. BERGER	339	Scavenging of ^{230}Th and ^{231}Pa near the Antarctic Polar Front in the South Atlantic
K. D. STOLZENBACH	359	Scavenging of small particles by fast-sinking porous aggregates
G. C. JOHNSON and J. M. TOOLE	371	Flow of deep and bottom waters in the Pacific at 10°N
F. THOMAS, J. F. MINSTER, P. GASPAR and Y. GREGORIS	395	Comparing the behaviour of two ocean surface models in simulating dissolved O_2 concentration at O.W.S.P.
<i>Notes</i>		
M. L. GRÜNDLINGH	409	On the winter flow in the southern Mozambique Channel
H. THIEL, G. SCHRIEVER, C. BUSSAU and C. BOROWSKI	419	Manganese nodule crevice fauna
List of Contents for <i>Continental Shelf Research</i> , Vol. 13, No. 1 and No. 2/3	i	

March

P. J. MÜLLER and R. SCHNEIDER	425	An automated leaching method for the determination of opal in sediments and particulate matter
J. M. NAPP, P. B. ORTNER, R. E. PIEPER and D. V. HOLLIDAY	445	Biovolume-size spectra of epipelagic zooplankton using a Multi-frequency Acoustic Profiling System (MAPS)
C. J. ASHJIAN	461	Trends in copepod species abundances across and along a Gulf Stream meander: evidence for entrainment and detrainment of fluid parcels from the Gulf Stream
C. J. ASHJIAN and K. F. WISNER	483	Temporal persistence of copepod species groups in the Gulf Stream
M. M. GOWING	517	Seasonal radiolarian flux at the VERTEX North Pacific time-series site
B. HAAKE, V. ITTEKKOT, S. HONJO and S. MANGANINI	547	Amino acid, hexosamine and carbohydrate fluxes to the deep Subarctic Pacific (Station P)
V. V. GOURETSKI and A. I. DANILOV	561	Weddell Gyre: structure of the eastern boundary
H. ICHIKAWA and R. C. BEARDSLEY	583	Temporal and spatial variability of volume transport of the Kuroshio in the East China Sea

Instruments and Methods

E. A. WIDDER, J. F. CASE, S. A. BERNSTEIN, S. MACINTYRE, M. R. LOWENSTINE, M. R. BOWLBY and D. P. COOK

J. A. BRELAND II and R. H. BYRNE

607 A new large volume bioluminescence bathy-photometer with defined turbulence excitation

629 Spectrophotometric procedures for determination of sea water alkalinity using bromocresol green

April

C. M. TURLEY, A. J. GOODAY and J. C. GREEN

J. P. JASPER and W. G. DEUSER

N. S. FISHER and M. WENTE

C. STEFANESCU, D. LLORIS and J. RUCABADO

C. SAVENKOFF, L. PRIEUR, J.-P. REYS, D. LEFEVRE, S. DALLOT and M. DENIS

O. PFANNKUCHE and K. LOCHTE

M. MELLES and G. KUHN

D. V. BOROLE

D. QUADFASER, A. SY and B. RUDELS

P. RAIMBAULT, B. COSTE, M. BOULHADID and B. BOUDJELLAL

M. D. KROM, S. BRENNER, N. KRESS, A. NEORI and L. I. GORDON

J. SPRINTALL and M. TOMCZAK

643 Maintenance of abyssal benthic foraminifera under high pressure and low temperature: some preliminary results

653 Annual cycles of mass flux and isotopic composition of pteropod shells settling into the deep Sargasso Sea

671 The release of trace elements by dying marine phytoplankton

695 Deep-sea fish assemblages in the Catalan Sea (western Mediterranean) below a depth of 1000 m

709 Deep microbial communities evidenced in the Liguro-Provençal front by their ETS activity

727 Open ocean pelago-benthic coupling: cyanobacteria as tracers of sedimenting salp faeces

739 Sub-bottom profiling and sedimentological studies in the southern Weddell Sea, Antarctica: evidence for large-scale erosional/depositional processes

761 Late Pleistocene sedimentation: a case study of the central Indian Ocean Basin

777 A ship of opportunity section to the North Pole: upper ocean temperature observations

791 Origin of high phytoplankton concentration in deep chlorophyll maximum (DCM) in a frontal region of the Southwestern Mediterranean Sea (Algerian Current)

805 Nutrient distributions during an annual cycle across a warm-core eddy from the E. Mediterranean Sea

827 On the formation of Central Water and thermocline ventilation in the southern hemisphere

Instruments and Methods

M. BASKARAN, D. J. MURPHY, P. H. SANTSCHI, J. C. ORR and D. R. SCHINK

J. DUNN, C. D. HALL, M. R. HEATH, R. B. MITCHELL and B. J. RITCHIE

849 A method for rapid *in situ* extraction and laboratory determination of Th, Pb, and Ra isotopes from large volumes of seawater

867 ARIES—a system for concurrent physical, biological and chemical sampling at sea

Note

Y.-H. PARK, L. GAMBERONI,
E. CHARRIAUD and J. GONELLA

List of Contents for *Continental Shelf
Research*, Vol. 13, No. 4

879 Does "Novara Knoll" exist?

i

May

M. R. ROMAN, H. G. DAM,
A. L. GAUZENS and J. M. NAPP

T. C. MALONE, S. E. PIKE and
D. J. CONLEY

K. G. SPEER

E. V. THUESEN and J. J. CHILDRESS

883 Zooplankton biomass and grazing at the JGOFS
Sargasso Sea time series station

903 Transient variations in phytoplankton productivity at
the JGOFS Bermuda time series station

925 The deep silica tongue in the North Atlantic

937 Metabolic rates, enzyme activities and chemical
compositions of some deep-sea pelagic worms,
particularly *Nectonemertes mirabilis* (Nemertea;
Hoplonemertinea) and *Poeobius meseres* (Annelida;
Polychaeta)

953 Labile organic matter and microbial biomasses in
deep-sea sediments (Eastern Mediterranean Sea)

967 Biomass and production of heterotrophic
bacterioplankton in the oceanic subarctic Pacific

989 Impact of atmospheric deposition on particulate iron
flux and distribution in northwestern Mediterranean
waters

R. DANOVARO, M. FABIANO and
N. D. CROCE

D. L. KIRCHMAN, R. G. KEIL, M. SIMON
and N. A. WELSCHMEYER

C. R. QUÉTEL, E. REMOUDAKI,
J. E. DAVIES, J.-C. MIQUEL,
S. W. FOWLER, C. E. LAMBERT,
G. BERGAMETTI and P. BUAT-MÉNARD

P. K. PROBERT and D. G. MCKNIGHT

1003 Biomass of bathyal macrobenthos in the region of the
Subtropical Convergence, Chatham Rise, New
Zealand

R. MILLARD, G. BOND and J. TOOLE

1009 Implementation of a titanium strain gauge pressure
transducer for CTD applications

J.-Z. ZHANG and F. J. MILLERO

1023 The chemistry of the anoxic waters in the Cariaco
Trench

N. H. MORLEY, P. J. STATHAM and
J. D. BURTON

1043 Dissolved trace metals in the southwestern Indian
Ocean

J. H. CHURCHILL, E. R. LEVINE,
D. N. CONNORS and P. C. CORNILLON

1063 Mixing of shelf, slope and Gulf Stream water over the
continental slope of the Middle Atlantic Bight

L. WESTERHAUSEN, J. POYNTER,
G. EGLINTON, H. ERLKENKEUSER and
M. SARNTHEIN

1087 Marine and terrigenous origin of organic matter in
modern sediments of the equatorial East Atlantic: the
 $\delta^{13}\text{C}$ and molecular record

Note

S. D. IYER and M. SUDHAKAR

1123 Coexistence of pumice and manganese nodule
fields—evidence for submarine silicic volcanism in
the Central Indian Basin

List of Contents for *Continental Shelf
Research*, Vol. 13, No. 5/6

i

June

Rapid Response Paper

A. L. ALLDREDGE, U. PASSOW and
B. E. LOGAN

- 1131 The abundance and significance of a class of large, transparent organic particles in the ocean

Research Papers

B. J. BURD and R. E. THOMSON

- 1141 Flow volume calculations based on three-dimensional current and net orientation data

K. KREMLING and P. STREU

- 1155 Saharan dust influenced trace element fluxes in deep North Atlantic subtropical waters

M. A. DE ANGELIS, M. D. LILLEY,
E. J. OLSON and J. A. BAROSS

- 1169 Methane oxidation in deep-sea hydrothermal plumes of the Endeavour Segment of the Juan de Fuca Ridge

D.-P. WANG

- 1187 The Strait of Gibraltar Model: internal tide, diurnal inequality and fortnightly modulation

R. J. GEIDER, R. M. GREENE,
Z. KOLBER, H. L. MACINTYRE and
P. G. FALKOWSKI

- 1205 Fluorescence assessment of the maximum quantum efficiency of photosynthesis in the western North Atlantic

J. SVAVARSSON, G. GUDMUNDSSON and
T. BRATTEGARD

- 1225 Feeding by asellote isopods (Crustacea) on foraminifers (Protozoa) in the deep sea

A. FIALA-MÉDIONI, J. BOULÈGUE,
S. OHTA, H. FELBECK and A. MARIOTTI

- 1241 Source of energy sustaining the *Calyptogena* populations from deep trenches in subduction zones off Japan

M. KAWASE

- 1259 Topographic effects on the bottom water circulation of the western tropical North Atlantic Ocean

H. R. VALENTINE, J. R. E. LUTJEHARMS
and G. B. BRUNDRIT

- 1285 The water masses and volumetry of the southern Agulhas Current region

Instruments and Methods

M. H. C. STOLL, J. W. ROMMETS and
H. J. W. DE BAAR

- 1307 Effect of selected calculation routines and dissociation constants on the determination of total carbon dioxide in seawater

July

EDITORIAL

I

Rapid Response Paper

B. HAAKE, V. ITTEKKOT, T. RIXEN,
V. RAMASWAMY, R. R. NAIR and
W. B. CURRY

- 1323 Seasonality and interannual variability of particle fluxes to the deep Arabian Sea

Research Papers

A. A. BIANCHI, C. F. GIULIVI and
A. R. PIOLA

- 1345 Mixing in the Brazil-Malvinas Confluence

G. BUDÉUS and G. KRAUSE

- 1359 On-cruise calibration of XBT probes

E. PASCHINI, A. ARTEGANI and
N. PINARDI

- 1365 The mesoscale eddy field of the Middle Adriatic Sea during fall 1988

- S. L. GARZOLI 1379 Geostrophic velocity and transport variability in the Brazil-Malvinas Confluence
- C. SAYDAM, S. TUGRUL, O. BASTURK and T. OGUZ 1405 Identification of the oxic/anoxic interface by isopycnal surfaces in the Black Sea
- G. ZHUANG and R. A. DUCE 1413 The adsorption of dissolved iron on marine aerosol particles in surface waters of the open ocean
- M. DAGG 1431 Sinking particles as a possible source of nutrition for the large calanoid copepod *Neocalanus cristatus* in the subarctic Pacific Ocean
- G. A. CANNON, D. J. PASHINSKI and M. R. LEMON 1447 Hydrothermal effects west of the Juan de Fuca Ridge
- D. RISOVIĆ 1459 Two-component model of sea particle size distribution
- C. M. YOUNG, P. A. TYLER, R. H. EMSON and J. D. GAGE 1475 Perception and selection of macrophyte detrital falls by the bathyal echinoid *Stylocidaris lineata*
- G. MALIN, S. TURNER, P. LISS, P. HOLLIGAN and D. HARBOUR 1487 Dimethylsulphide and dimethylsulphoniopropionate in the Northeast Atlantic during the summer coccolithophore bloom

Instruments and Methods

- H. A. CHRISTIAN, D. E. HEFFLER and E. E. DAVIS 1509 Lancelot—an *in situ* piezometer for soft marine sediments

Note

- A. E. HILL and E. G. MITCHELSON-JACOB 1521 Observations of a poleward-flowing saline core on the continental slope west of Scotland

List of Contents for *Continental Shelf Research*, Vol. 13 No. 7 i

August

- S. L. CLEGG and M. WHITFIELD 1529 Application of a generalized scavenging model to time series ^{234}Th and particle data obtained during the JGOFS North Atlantic Bloom Experiment
- J. FISCHER and M. VISBECK 1547 Seasonal variation of the daily zooplankton migration in the Greenland Sea
- J. F. GENDRON, J. P. COWEN, R. A. FEELY and E. T. BAKER 1559 Age estimate for the 1987 megaplume on the southern Juan de Fuca Ridge using excess radon and manganese partitioning
- J. K. COCHRAN, K. O. BUESSELER, M. P. BACON and H. D. LIVINGSTON 1569 Thorium isotopes as indicators of particle dynamics in the upper ocean: results from the JGOFS North Atlantic Bloom Experiment
- T. OGUZ, V. S. LATUN, M. A. LATİF, V. V. VLADIMIROV, H. İ. SUR, A. A. MARKOV, E. ÖZSOY, B. B. KOTOVSHCHIKOV, V. V. EREMEEV and Ü. ÜNLÜATA 1597 Circulation in the surface and intermediate layers of the Black Sea
- G. WEFER and G. FISCHER 1613 Seasonal patterns of vertical particle flux in equatorial and coastal upwelling areas of the eastern Atlantic

R. R. RAO, B. MATHEW and
P. V. HAREESH KUMAR

- 1647 A summary of results on thermohaline variability in the upper layers of the east central Arabian Sea and Bay of Bengal during summer monsoon experiments

Instruments and Methods

R. D. BALLARD

- 1673 The MEDEA/JASON remotely operated vehicle system

A. POISSON and M. H. GADHOUMI

- 1689 An extension of the Practical Salinity Scale 1978 and the Equation of State 1980 to high salinities

Notes

G. F. LANE-SERFF

- 1699 On drag-limited gravity currents

A. BIANCHI and J. GARCIN

- 1703 In stratified waters the metabolic rate of deep-sea bacteria decreases with decompression

- 1711 Letter to the Editor

List of Contents for *Continental Shelf Research*, Vol. 13, No. 8/9

i

September

PUBLISHER'S NOTE

I

Research Papers

B. VAN OS, H.-J. VISSER,
J. J. MIDDELBURG and G. J. DE LANGE

- 1713 Occurrence of thin, metal-rich layers in deep-sea sediments: a geochemical characterization of copper remobilization

D. HEBBELN and H. BERNER

- 1731 Surface sediment distribution in the Fram Strait

J. NEVEUX and F. LANTOINE

- 1747 Spectrofluorometric assay of chlorophylls and phaeopigments using the least squares approximation technique

B. J. BETT and A. L. RICE

- 1767 The feeding behaviour of an abyssal echinuran revealed by *in situ* time-lapse photography

G. C. JOHNSON

- 1781 A deep inertial jet on a sloping bottom near the equator

P. G. VERITY, D. K. STOECKER,
M. E. SIERACKI and J. R. NELSON

- 1793 Grazing, growth and mortality of microzooplankton during the 1989 North Atlantic spring bloom at 47°N, 18°W

S. BEŞİKTEPE, E. ÖZSOY and
Ü. ÜNLÜATA

- 1815 Filling of the Marmara Sea by the Dardanelles lower layer inflow

J. H. LEE and G. VERONIS

- 1839 Inversions of data from the thermohaline staircase in the western tropical North Atlantic

D. BOLTOVSKOY, V. A. ALDER and
A. ABELMANN

- 1863 Annual flux of Radiolaria and other shelled plankters in the eastern equatorial Atlantic at 853 m: seasonal variations and polycystine species-specific responses

R. P. MASON and W. F. FITZGERALD

- 1897 The distribution and biogeochemical cycling of mercury in the equatorial Pacific Ocean

W. ZENK, K. G. SPEER and N. G. HOGG

- 1925 Bathymetry at the Vema Sill

List of Contents for *Continental Shelf Research*, Vol. 13, No. 10

i

October

- | | |
|--|--|
| M. H. CONTE and G. EGLINTON | 1935 Alkenone and alkenoate distributions within the euphotic zone of the eastern North Atlantic: correlation with production temperature |
| G. COPIN-MONTÉGUT and B. AVRIL | 1963 Vertical distribution and temporal variation of dissolved organic carbon in the North-Western Mediterranean Sea |
| J. M. TOOLE and B. A. WARREN | 1973 A hydrographic section across the subtropical South Indian Ocean |
| R. A. FINE | 2021 Circulation of Antarctic Intermediate Water in the South Indian Ocean |
| L. CAMPBELL and D. VAULOT | 2043 Photosynthetic picoplankton community structure in the subtropical North Pacific Ocean near Hawaii (station ALOHA) |
| F. G. PRAHL, R. B. COLLIER, J. DYMOND, M. LYLE and M. A. SPARROW | 2061 A biomarker perspective on prymnesiophyte productivity in the northeast Pacific Ocean |
| R. D. PINGREE and B. LE CANN | 2077 Structure of a meddy (Bobby 92) southeast of the Azores |
| <i>Instruments and Methods</i> | |
| S. NARAYANAN and G. R. LILLY | 2105 On the accuracy of XBT temperature profiles |
| T. D. CLAYTON and R. H. BYRNE | 2115 Spectrophotometric seawater pH measurements: total hydrogen ion concentration scale calibration of <i>m</i> -cresol purple and at-sea results |

November/December

Rapid Response Papers

- | | |
|--|--|
| A. J. GOODAY, B. J. BETT and D. N. PRATT | 2131 Direct observation of episodic growth in an abyssal xenophyophore (Protista) |
| A. LONGHURST | 2145 Seasonal cooling and blooming in tropical oceans |
| <i>Full Papers</i> | |
| H.-H. HINRICHSSEN and M. RHEIN | 2167 On the origin and the spreading of the shallow Mediterranean water core in the Iberian Basin |
| J. PINEDA | 2179 Boundary effects on the vertical ranges of deep-sea benthic species |
| C. M. TURLEY | 2193 The effect of pressure on leucine and thymidine incorporation by free-living bacteria and by bacteria attached to sinking oceanic particles |
| B. A. KING and E. B. COOPER | 2207 Comparison of ship's heading determined from an array of GPS antennas with heading from conventional gyrocompass measurements |

T. DELCROIX	2217	Seasonal and interannual variability of sea surface temperatures in the tropical Pacific, 1969-1991
R. G. BARLOW, R. F. C. MANTOURA, M. A. GOUGH and T. W. FILEMAN	2229	Phaeopigment distribution during the 1990 spring bloom in the northeastern Atlantic
D. NOF	2243	The β -induced drift of separated boundary currents
C. AGRA and D. NOF	2259	Collision and separation of boundary currents
R. GOERICKE and N. A. WELSCHMEYER	2283	The marine prochlorophyte <i>Prochlorococcus</i> contributes significantly to phytoplankton biomass and primary production in the Sargasso Sea
C. CORNET and J.-M. GILI	2295	Vertical distribution and daily migrations of hyperiid amphipods in the northern Benguela in relation to water column stratification
K. L. SMITH JR, R. S. KAUFMANN and W. W. WAKEFIELD	2307	Mobile megafaunal activity monitored with a time-lapse camera in the abyssal North Pacific
R. K. REED, G. V. KHEN, P. J. STABENO and A. V. VERKHUNOV	2325	Water properties and flow over the deep Bering Sea basin, summer 1991
T. GAMO, H. SAKAI, J. ISHIBASHI, E. NAKAYAMA, K. ISSHIKI, H. MATSUURA, K. SHITASHIMA, K. TAKEUCHI and S. OHTA	2335	Hydrothermal plumes in the eastern Manus Basin, Bismarck Sea: CH ₄ , Mn, Al and pH anomalies
S. EMERSON, P. QUAY and P. A. WHEELER	2351	Biological productivity determined from oxygen mass balance and incubation experiments
N. G. HOGG	2359	Toward parameterization of the eddy field near the Gulf Stream
G. F. LANE-SERFF	2377	A model for Meddy formation
F. SARDÀ and J. E. CARTES	2389	Relationship between size and depth in decapod crustacean populations on the deep slope in the Western Mediterranean

AUTHOR INDEX

- Abelman, A. 1863
 Agra, C. 2259
 Alder, V. A. 1863
 Alldredge, A. L. 1131(RRP)
 Artegiani, A. 1365
 Ashjian, C. J. 461, 483
 Avril, B. 1963

 Bacon, M. P. 1569
 Baker, E. T. 1559
 Ballard, R. D. 1673(I+M)
 Barlow, R. G. 2229
 Baross, J. A. 1169
 Baskaran, M. 849(I+M)
 Basturk, O. 1405
 Beardsley, R. C. 583
 Bergametti, G. 989
 Berger, G. W. 339
 Berner, H. 1731
 Bernstein, S. A. 607(I+M)
 Beşiktepe, S. 1815
 Bett, B. J. 1767, 2131(RRP)
 Bianchi, A. A. 1345, 1703(N)
 Bingham, B. L. 1
 Boltovskoy, D. 1863
 Bond, G. 1009
 Borole, D. V. 761
 Borowski, C. 419(N)
 Boudjellal, B. 791
 Boulègue, J. 1241
 Boulhadid, M. 791
 Bowlby, M. R. 607(I+M)
 Brattegard, T. 1225
 Breland, J. A. 629(I+M)
 Brenner, S. 805
 Brundrit, G. B. 1285
 Buat-Ménard, P. 989
 Buck, K. R. 311
 Budéus, G. 1359
 Buesseler, K. O. 1569
 Burd, B. J. 1141
 Burton, J. D. 1043
 Bussau, C. 419(N)
 Byrne, R. H. 629(I+M), 2115(I+M)

 Campbell, L. 2043
 Cannon, G. A. 1447
 Cartes, J. E. 2389
 Case, J. F. 607(I+M)
 Charriaud, E. 879(N)
 Childress, J. J. 937
 Christian, H. A. 1509(I+M)

 Churchill, J. H. 1063
 Clayton, T. D. 2115(I+M)
 Clegg, S. L. 1529
 Cochran, J. K. 1569
 Collier, R. B. 2061
 Conley, D. J. 903
 Connors, D. N. 1063
 Conte, M. H. 1935
 Cook, D. P. 607(I+M)
 Cooper, E. B. 2207
 Copin-Montégut, G. 1963
 Cornet, C. 2295
 Cornillon, P. C. 1063
 Coste, B. 791
 Cowen, J. P. 1559
 Croce, N. D. 953
 Curry, W. B. 1323(RRP)

 Dagg, M. 1431
 Dallot, S. 709
 Dam, H. G. 883
 Danilov, A. I. 561
 Danovaro, R. 953
 David, P. M. 119
 Davies, J. E. 989
 Davis, E. E. 1509(I+M)
 de Angelis, M. A. 1169
 de Lange, G. J. 1731
 De Baar, H. J. W. 1307(I+M)
 Delcroix, T. 2217
 Denis, M. 709
 Deuser, W. G. 653
 Dickson, A. G. 107
 Donnelly, J. 81
 Duce, R. A. 1413
 Dunn, J. 867(I+M)
 Dymond, J. 2061

 Eckman, J. E. 151
 Eglinton, G. 1087, 1935
 Emerson, S. 2351
 Emson, R. H. 1475
 Ereemeev, V. V. 1597
 Erlenkeuser, H. 1087

 Fabiano, M. 953
 Falkowski, P. G. 1205
 Feely, R. A. 1559
 Felbeck, H. 1241
 Fiala-Médioni, A. 1241
 Fileman, T. W. 2229
 Fine, R. A. 2021

Fischer, G. 1613
 Fischer, J. 1547
 Fisher, N. S. 671
 Fitzgerald, W. F. 1897
 Fowler, S. W. 989
 Fratantoni, D. M. 293

Gadhoumi, M. H. 1689(I+M)
 Gage, J. D. 1475
 Gamberoni, L. 879(N)
 Gamo, T. 2335
 Garcin, J. 1703(N)
 Garrison, D. L. 311
 Garzoli, S. L. 1379
 Gaspar, P. 395
 Gauzens, A. L. 883
 Geider, R. J. 1205
 Gendron, J. F. 1559
 Gili, J.-M. 2295
 Goericke, R. 2283
 Goldman, J. C. 159
 Gonella, J. 879(N)
 Gooday, A. J. 643, 2131(RRP)
 Gordon, L. I. 805
 Gough, M. A. 2229
 Gouretski, V. V. 561
 Gowing, M. M. 311, 517
 Green, J. C. 643
 Greene, R. M. 1205
 Gregoris, Y. 395
 Gründlingh, M. L. 409(N)
 Gudmundsson, G. 1225
 Guerin-Ancey, O. 119
 Guilivi, C. F. 1345

Haake, B. 547, 1323(RRP)
 Hall, C. D. 867(I+M)
 Hansell, D. A. 219
 Harbour, D. 1487
 Hareesh Kumar, P. V. 1647
 Heath, M. R. 867(I+M)
 Hebbeln, D. 1731
 Heffler, D. E. 1509(I+M)
 Hilbig, B. 151
 Hill, A. E. 1521(N)
 Hinrichsen, H.-H. 267, 2167
 Hogg, N. G. 1925, 2359
 Holliday, D. V. 445
 Holligan, P. 1487
 Honjo, S. 547
 Hopkins, T. L. 81
 Hudson, R. J. M. 129

Ichikawa, H. 583
 Ishibashi, J. 2335
 Isshiki, K. 2335
 Ittekkot, V. 547, 1323(RRP)
 Iyer, S. D. 1123(N)

Jasper, J. P. 653
 Johns, W. E. 293
 Johnson, G. C. 371, 1781

Kaufmann, R. S. 2307
 Kawase, M. 1259
 Keil, R. G. 967
 Khen, G. V. 2325
 King, B. A. 2207
 Kirchman, D. L. 967
 Kolber, Z. 1205
 Kotovshchikov, B. B. 1597
 Krause, G. 1359
 Kremling, K. 257, 1155
 Kress, N. 805
 Krom, M. D. 805
 Kuhn, G. 739

Lambert, C. E. 989
 Lancraft, T. M. 81
 Lane-Serff, G. F. 1699(N), 2377
 Lantoine, F. 1747
 Latif, M. A. 1597
 Latun, V. S. 1597
 Le Cann, B. 2077
 Lee, J. H. 1839
 Lefevre, D. 709
 Lemon, M. R. 1447
 Levine, E. R. 1063
 Lilley, M. D. 1169
 Lilly, G. R. 2105(I+M)
 Liss, P. 1487
 Livingston, H. D. 1569
 Lloris, D. 695
 Lochte, K. 727
 Logan, B. E. 1131(RRP)
 Longhurst, A. 2145(RRP)
 Lowenstine, M. R. 607(I+M)
 Lutjeharms, J. R. E. 1285
 Lyle, M. 2061

MacIntyre, H. L. 1205
 MacIntyre, S. 607(I+M)
 Malin, G. 1487
 Malone, T. C. 903
 Manganini, S. 547

- Mantoura, R. F. C. 2229
 Markov, A. A. 1597
 Maroitti, A. 1241
 Mason, R. P. 1897
 Mathew, B. 1647
 Matsuura, H. 2335
 McKnight, D. G. 1003
 Melles, M. 739
 Middelburg, J. J. 1731
 Millard, R. 1009
 Millero, F. J. 1023
 Minster, J. F. 395
 Miquel, J.-C. 989
 Mitchell, R. B. 867(I+M)
 Mitchelson-Jacob, E. G. 1521(N)
 Morel, F. M. M. 129
 Morley, N. H. 1043
 Müller, P. J. 425
 Murphy, D. J. 849(I+M)
 Murty, V. S. N. 205
- Nair, R. R. 1323(RRP)
 Nakayama, E. 2335
 Napp, J. M. 445, 883
 Narayanan, S. 2105(I+M)
 Nelson, J. R. 1793
 Neori, A. 805
 Neveux, J. 1747
 Nof, D. 235, 2243, 2259
 Nowlin, W. D. Jr, 169
- Oguz, T. 1405, 1597
 Ohta, S. 1241, 2335
 Olson, D. B. 235
 Olson, E. J. 1169
 Orr, J. C. 849(I+M)
 Orsi, A. H. 169
 Ortner, P. B. 445
 Os, B. van 1713
 Özsoy, E. 1597, 1815
- Park, Y.-H. 879(I+M)
 Paschini, E. 1365
 Pashinski, D. J. 1447
 Passow, U. 1131(RRP)
 Pfannkuche, O. 727
 Pieper, R. E. 445
 Pike, S. E. 903
 Pinardi, N. 1365
 Pineda, J. 2179
 Pingree, R. D. 2077
 Piola, A. R. 1345
 Poisson, A. 1689(I+M)
 Poynter, J. 1087
- Prael, F. G. 2061
 Pratt, D. N. 2131(RRP)
 Prieur, L. 709
 Probert, P. K. 1003
- Quadfasel, D. 777
 Quay, P. 2351
 Quézel, C. R. 989
- Raimbault, P. 791
 Ramaswamy, V. 1323(RRP)
 Rao, D. P. 205
 Rao, R. R. 1647
 Reed, R. K. 2325
 Remoudaki, E. 989
 Reys, J.-P. 709
 Rhein, M. 267, 2167
 Rice, A. L. 1767
 Risović, D. 1459
 Ritchie, B. J. 867(I+M)
 Rixen, T. 1323(RRP)
 Roman, M. R. 883
 Rommets, J. W. 1307(I+M)
 Rucabado, J. 695
 Rudels, B. 777
 Rutgers van der Loeff, M. M. 339
- Sakai, H. 2335
 Santschi, P. H. 849(I+M)
 Sardà, F. 2389
 Sarnthein, M. 1087
 Savenkoff, C. 709
 Saydam, C. 1405
 Schink, D. R. 849(I+M)
 Schneider, R. 425
 Schriever, G. 419(N)
 Schüssler, U. 257
 Shitashima, K. 2335
 Sieracki, M. E. 1793
 Simon, M. 967
 Smith, K. L. Jr 2307
 Sparrow, M. A. 2061
 Speer, K. G. 925, 1925
 Sprintall, J. 827
 Stabeno, P. J. 2325
 Statham, P. J. 1043
 Stefanescu, C. 695
 Stoecker, D. K. 1793
 Stoll, M. H. C. 1307(I+M)
 Stolzenbach, K. D. 359
 Streu, P. 1155
 Strom, S. L. 57
 Sudhakar, M. 1123(N)
 Sur, H. I. 1597

Suryanarayana, A. 205
Svavarsson, J. 1225
Sy, A. 777

Takeuchi, K. 2335
Thiel, H. 419(N)
Thistle, D. 151
Thomas, F. 395
Thomson, R. E. 1141
Thuesen, E. V. 937
Tomczak, M. 13, 827
Toole, J. M. 371, 1009, 1973
Torres, J. J. 81
Tugrul, S. 1405
Turley, C. M. 643, 2193
Turner, S. 1487
Tyler, P. A. 1475

Ünlüata, Ü. 1597, 1815

Valentine, H. R. 1285
Vaulot, D. 2043
Verity, P. G. 1793
Verkhunov, A. V. 2325
Veronis, G. 1839

Visbeck, M. 1547
Visser, H.-J. 1713
Vladimirov, V. V. 1597

Wakefield, W. W. 2307
Wang, D.-P. 1187
Ward, B. B. 219
Warren, B. A. 1973
Wefer, G. 1613
Welschmeyer, N. A. 967, 2283
Wente, M. 671
Westerhausen, L. 1087
Wheeler, P. A. 2351
Whitfield, M. 1529
Whitworth, T. 169
Widder, E. A. 607(I+M)
Williams, P. M. 219
Wishner, K. F. 483

You, Y. 13
Young, C. M. 1, 1475

Zantopp, R. J. 293
Zenk, W. 1925
Zhang, J.-Z. 1023
Zhuang, G. 1413

